The Persistence of the NCAV Stock Selection Criterion

Joseph M. Goebel and Manoj Athavale*

The Net Current Asset Value (NCAV) rule continues to identify successfully firms that will provide superior risk-adjusted holding period returns after accounting for size, book-to-market (BM), risk, and prior performance. Relative to other firms, the NCAV firms (1) are more numerous during economic contractions, (2) are less likely to trade on the NYSE, (3) are less likely to be delisted because of liquidation, (4) are smaller firms, (5) have greater variance in holding period returns, (6) have higher BM ratios, and (7) have underperformed prior to their identification as NCAV opportunities. Overreaction serves as a partial explanation for the superior performance of NCAV firms.

I. Introduction

Numerous theoretical and empirical studies conducted over the last half century have explained the behavior of stock returns. These studies sought to develop theory explaining stock returns (for example, the Efficient Market Hypothesis), develop models which apply financial theory to explain returns (for example, the Capital Asset pricing Model), demonstrate the existence of exceptions to the models (for example, anomalies such as the January effect), and finally to examine the persistence (or otherwise) of these anomalies. One such anomaly, which was developed into a stock selection criterion by Benjamin Graham, is the Net Current Asset Value (NCAV) rule.

The NCAV rule is inconsistent with generally accepted rational expectations equilibrium models of cross-sectional returns. In his book *The Intelligent Investor* (1949), Graham suggests that NCAV opportunities exist when a firm's net current asset value, defined as the difference between current assets and total liabilities (including preferred stock), is 1.5 times or more than the current market value of the firm's common equity. Through *The Intelligent Investor*, Graham reports that NCAV firms experienced superior returns averaging 20 % per year for roughly three decades beginning in 1930 whereas in the 1960s and early 1970s, these opportunities were generally less pronounced and clustered around market downturns. Although the NCAV selection criterion has been a surprisingly long-standing success, only a limited number of studies focus explicitly on the performance of NCAV opportunities in U.S. markets. These

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studies focus on the time frame prior to 1983 and do not account for variables such as the book-to-market (BM) ratio that have since been found relevant to explaining the cross-sectional variation of returns.

The purpose of this study is to determine if the superior performance of NCAV firms in U. S. markets has persisted beyond the 1971-1983 time frame analyzed in prior studies. We use a more complete set of control variables in accounting for the cross-sectional variation of returns and after accounting for these differences find that NCAV portfolios continue to outperform non-NCAV portfolios.

The paper proceeds as follows. Section II provides a review of the literature and leads to hypotheses development. Section III details the data used in the study. Section IV describes the methods used to analyze the data and presents the results of our analysis together with a discussion of these results. And finally, Section V contains our concluding comments.

II. Literature Review and Hypotheses Development

In one of the earlier tests of the NCAV rule, Oppenheimer (1986) identifies NCAV opportunities originating in the 1970-1982 period and shows that NCAV portfolios earned risk-adjusted annual excess returns of 19 % over the NYSE-AMEX index and 8 % over a small-firm index. However, while both AMEX and OTC traded NCAV firms outperformed the benchmarks, NYSE traded NCAV firms did not. He shows that the superior performance of NCAV firms is not related to the size effect (since the sample OTC firms are approximately the same size as the sample NYSE firms). Further, he reveals that the superior performance of NCAV firms is maintained even after adjusting for the "January effect" identified by Keim (1983) and is superior to that of alternate small-firm portfolios as reported by Reinganum (1983).

The event study methodology of Vu (1988) indicates that firm-specific price declines lead to NCAV opportunities. Vu (1988) uses standard event study methodology to analyze NCAV opportunities identified in the 1977-1984 period and finds significant positive cumulative abnormal returns over the two years following the identification of NCAV firms. Five of the seven months prior to identification are associated with negative raw returns, and eleven of the twelve months prior to identification are associated with negative excess returns. Further, both the raw return and excess returns are significantly negative in the month prior to identification of NCAV firms, which leads Vu to suggest that recent price declines lead to the availability of NCAV opportunities.

It is possible, however, that price declines reflect systematic relative size changes that render standard event study methodology inappropriate because abnormal returns over time are correlated to changes in size premiums (Dimson & Marsh, 1986). This correlation can lead to biased reported abnormal returns, and this bias becomes pronounced as the size premium changes between the estimation and event intervals. Thus, the decline in size prior to identification of NCAV opportunities identified in Vu (1988) is likely to lead to biased post-identification return measurement. Lauterbach and Vu (1993) correct for the impact of size on abnormal returns but obtain conflicting results. The post-identification cumulative abnormal return is -14.5 % (t = -3.2) using the Dimson and Marsh (1986) methodology but +7.6 % (t = +1.7) using the Huberman and Kandel (1985) methodology. Further, research by DeBondt and

Thaler (1985, 1987) reveals evidence of long-term price reversals by demonstrating that five-year returns are inversely related to the prior five-year returns. Such reversals manifest only for portfolios with holding periods of greater than one year. Thus, studies that focus on abnormal return performance over the one year prior to identification of an NCAV opportunity using market model parameter estimates obtained from the second or third year prior to identification may be biased.

In our study, we avoid this bias by focusing on the difference in holding period return (HPR) performance between NCAV and non-NCAV firms during the period prior to identification as an NCAV opportunity (PRE) and during the period subsequent to identification (POST). This comparison of PRE-identification HPRs and POST-identification HPRs of NCAV and non-NCAV firms leads to the hypotheses:

H1a: *PRE HPRs for NCAV firms are significantly less than PRE HPRs of non-NCAV firms.*
H1b: *POST HPRs for NCAV firms are significantly greater than those of non-NCAV firms.*

Differences in size are associated with systematic differences in both average returns and betas (Chan & Chen, 1988), and the high correlation between size and portfolio beta prevents standard asset-pricing tests from separating size and beta effects in explaining returns (Fama & French, 1992). While Oppenheimer (1986) and Vu (1988) do not explicitly incorporate the cross-sectional variation of size, Lauterbach and Vu (1993) do not explicitly incorporate the cross-sectional variation of beta in explaining NCAV portfolio returns. Further, other studies show that the cross-sectional variation in equity returns is explained by variables such as firm size and BM (Banz, 1981; Reinganum, 1981, 1983; Fama & French, 1992, 1993, 1995, 1996, 1998; Grinold, 1993; Davis, 1994; He & Ng, 1994). These studies show that smaller firms outperform larger firms, and value firms outperform growth firms through time.

In summary, the superior performance of NCAV firms may thus be associated with a greater variance of returns and higher systematic risk relative to non-NCAV firms. Further, the superior performance of NCAV firms may be attributed to differences in size and differences in the BM ratio relative to non-NCAV firms. And finally, the superior performance of NCAV firms may reflect a correction for overreaction. This discussion leads to the hypothesis:

H2: *The superior performance of NCAV firms is independent of other factors which may influence returns including PRE HPRs, systematic risk, return variance, size, and the BM ratio.*

The purpose of this study is to determine if the superior performance of NCAV firms in U. S. markets has persisted beyond the time frame analyzed in prior studies using appropriate methodology and control variables and to explore the adequacy of financial distress risk and overreaction as explanations for this performance. We find that NCAV portfolios do outperform non-NCAV portfolios. Financial distress risk and overreaction serve as partial explanations for the superior performance of NCAV firms. The superior performance of NCAV firms persists even after controlling for cross-sectional differences in firm characteristics, financial distress risk, and overreaction through measures such as size, book-to-market, variance, systematic risk, and pre-identification performance.

III. Data

We analyze the performance of NYSE, AMEX, and NASDAQ listed firms from the 1971-2007 period using the University of Chicago's Center for Research in Security Prices (CRSP) monthly database and Standard and Poor's COMPUSTAT annual industrial database. Depository receipts, closed-end funds, real-estate investment trusts, and firms with SIC codes reflecting industries regulated at any time during this interval (utility, airline, credit intermediation, and insurance) are excluded from the analysis. We match data from the CRSP and COMPUSTAT files by firm and year and use the merged data to identify NCAV opportunities.

Following the methodology of Fama and French (1992), we obtain the book value of equity (B) from COMPUSTAT reflecting fiscal year-end t-1. We calculate size (M) for each firm through multiplying price by the number of shares outstanding reported by CRSP at the end of June for each year t. The delay of six months between B and M helps to ensure that information reflected through annual statement reporting is fully reflected in price by the time that POST HPRs are calculated. Thus, PRE HPRs end with June in year t whereas POST HPRs begin with July of year t. We include only established firms; hence, firms which did not have monthly holding period returns for a full 24-month period prior to consideration are also excluded from the analysis.

A firm is identified as an NCAV firm if net current asset value, defined as the difference between current assets and total liabilities (including preferred stock), is 1.5 times or more than the current market value of the firm's common equity. A firm which does not meet that criterion is called a non-NCAV firm. Thus, an NCAV firm meets the screening criterion:

$$\frac{Current\ Assets - Total\ Liabilities - Preferred\ Stock}{Market\ Value\ of\ Common\ Equity} \geq 1.5$$

The distribution of non-NCAV and NCAV firms by exchange and year is presented in Table 1. This table includes periods of economic expansion and contraction as identified by the National Bureau of Economic Research (NBER). Over the time frame analyzed, NBER identified six periods of economic contraction: (1) November, 1973 through March, 1975; (2) January, 1980 through July, 1980; (3) July 1981 through November 1982, (4) July 1990 through March 1991, (5) March 2001 through November 2001, and (6) December 2007 through June 2009.

IV. Analysis and Results

Our initial screening process allows us to identify 1,015 NCAV opportunities. AMEX- listed firms account for 552 (54.38%); NASDAQ-listed firms account for 347 (34.19%); and NYSE-listed firms account for 116 (11.43%) of the 1,015 NCAV firm-years. In contrast, NYSE firms account for 28,493 (40.95%); NASDAQ firms account for 26,961 (38.75%); and AMEX firms

account for 14,124 (20.30%) of the 69,578 non-NCAV firm-years. The difference in proportion of NCAV and non-NCAV firms by exchange listing is significant (χ^2=779.58).

The role of economic expansions and contractions in generating NCAV opportunities is pronounced for NYSE and AMEX firms, particularly during the early economic contractions. During the first two contractions, a time period reflecting six of the thirty-seven years in our sample, 336 "bargain" opportunities (33% of the total) are identified. Of the 116 NYSE-listed NCAV opportunities, 73 (63%) are in this period; and of the 552 AMEX listed opportunities, 259 (47%) are in this period. NASDAQ, however, is not operational until 1972: There are relatively few firms on NASDAQ at first; the incidence of NASDAQ firms in our sample grows substantially only after 1983; and by 2007 NASDAQ firms are greater in number than NYSE and AMEX firms combined. Over time, NYSE firms are associated with relatively fewer NCAV opportunities than AMEX and NASDAQ firms regardless of the economic conditions. The distribution of NCAV firms presented in Table 1 is consistent with the premise that NCAV opportunities appear to cluster around economic contractions.

While the initial screening process identifies 1,015 NCAV opportunities during the period 1971-2007, the number of firms that continue in existence after 12, 24, 36, 48, and 60 months becomes progressively smaller because some firms are delisted post identification, and we are unable to examine the post-identification returns of such firms. Information about the number of firms delisted for the primary reasons identified by CRSP (mergers, exchanges, liquidations, and dropped) is presented in Table 2.

We are interested in examining the post-identification holding period returns (POST HPRs) of NCAV firms relative to non-NCAV firms. However, as we calculate longer interval HPRs (12, 24, 36, 48 and 60 month), the time frame used in determining eligible firms decreases by one year because CRSP data are available to us only through 2008 at the time of our analysis. Of the 1,015 NCAV firms from the 1971-2007 period, 24 are delisted for various reasons during the 12 months post identification leaving us with 991 observations for which we could calculate 12-month HPRs. Similarly, of the 1,014 NCAV firms (from Table 1: 1,015 – 1 = 1,014) from the 1971-2006 period, 71 are delisted during the 24 months post identification leaving us with 943 observations for which we could calculate 24-month HPRs. Beaver, McNichols, & Price. (2007) demonstrate that tests of market efficiency are sensitive to delisting returns. Thus, in order to reduce this survivorship bias, all firms, including those delisted, are included in the HPR calculations. If a firm is delisted for any reason, the delisting return reported by CRSP is used as the last return in computing HPRs. Note that Shumway and Warther (1999) report that the average delisting return for stocks with missing CRSP delisting returns is -55%; hence, if the CRSP delisting return are not available, we use -55% as a substitute for the delisted return in the calculation of HPR.

In total, of 59,700 non-NCAV firms and 1,005 NCAV firms identified over the 1971 to 2003 period; 8,475 non-NCAV firms and 224 NCAV firms are delisted post identification leaving us with 51,225 non-NCAV firms (86%) and 781 NCAV firms (78%) for which we can calculate 60-month HPRs. Thus, over the 60-month post identification period, relatively fewer non-NCAV firms (14%) are delisted as compared to NCAV firms (22%). However, only a small proportion of NCAV firms are delisted because of liquidations while many others are delisted because of a merger or exchange, and others are dropped because they delist voluntarily or fail to meet continuing listing requirements. The difference in proportions of delisting by reason between

Table 1. The Distribution of Non-NCAV and NCAV Firms by Exchange and Year

Year	NYSE Firms		AMEX Firms		NASDAQ Firms		TOTAL Firms	
	Non-NCAV	NCAV	Non-NCAV	NCAV	Non-NCAV	NCAV	Non-NCAV	NCAV
1971	686	0	224	1	0	0	910	1
1972	728	0	238	3	0	0	966	3
1973	760	3	569	6	1	0	1330	9
1974	753	17	489	48	0	1	1242	66
1975	781	47	505	154	6	2	1292	203
1976	843	13	601	78	8	0	1452	91
1977	851	3	614	40	10	0	1475	43
1978	856	2	558	41	11	0	1425	43
1979	838	4	527	38	15	0	1380	42
1980	816	2	509	26	19	0	1344	28
1981	793	3	458	16	26	0	1277	19
1982	767	1	465	9	23	1	1255	11
1983	762	1	466	5	75	0	1303	6
1984	734	0	436	1	388	0	1558	1
1985	700	1	404	2	522	1	1626	4
1986	668	2	388	0	875	2	1931	4
1987	658	0	366	0	927	2	1951	2
1988	637	1	355	6	947	10	1939	17
1989	620	0	338	0	929	7	1887	7
1990	611	0	324	6	884	12	1819	18
1991	639	2	310	16	805	33	1754	51
1992	664	1	319	13	823	27	1806	41
1993	707	1	331	5	1081	17	2119	23
1994	755	0	324	2	1090	7	2169	9
1995	766	1	316	2	1154	12	2236	15
1996	808	1	316	1	1232	6	2356	8
1997	821	0	318	1	1415	6	2554	7
1998	817	0	314	0	1614	10	2745	10
1999	802	0	291	2	1557	26	2650	28
2000	774	1	280	5	1441	13	2495	19
2001	871	6	303	11	1257	54	2431	71
2002	878	2	313	7	1334	36	2525	45
2003	885	1	291	7	1322	52	2498	60
2004	886	0	300	0	1353	3	2539	3
2005	866	0	304	0	1311	3	2481	3
2006	864	0	329	0	1285	3	2478	3
2007	828	0	331	0	1221	1	2380	1
Total	28493	116	14124	552	26961	347	69578	1015
Average/Year	770.08	3.14	381.73	14.92	728.68	9.38	1880.49	27.43
High	886	47	614	154	1614	54	2745	203
Low	611	0	224	0	0	0	910	1
% of Total	40.95%	11.43%	20.30%	54.38%	38.75%	34.19%	100.00%	100.00%

A NCAV firm is defined to be one whose net current asset value, defined as the difference between current assets and total debt (including preferred stock), is 1.5 times or more than the current market value of the firm's common equity. A firm which does not meet that criterion is called a non-NCAV firm.

Table 2.The Delisting of Non-NCAV and NCAV Firms Post Identification

Time frame		NYSE Firms		AMEX Firms		NASDAQ Firms		TOTAL Firms	
		Non-NCAV	NCAV	Non-NCAV	NCAV	Non-NCAV	NCAV	Non-NCAV	NCAV
12 months post (1971-2007)	Mergers	263	1	165	5	115	0	543	6
	Exchanges	14	0	12	0	4	0	30	0
	Liquidations	5	0	3	0	2	1	10	1
	Dropped	52	1	139	11	99	5	290	17
	Number of firms	28159	114	13805	536	26741	341	68705	991
	%	98.83	98.28	97.74	97.10	99.18	98.27	98.75	97.64
24 months post (1971-2006)	Mergers	1083	5	625	22	440	2	2148	29
	Exchanges	55	0	45	2	19	0	119	2
	Liquidations	17	0	17	0	6	1	40	1
	Dropped	179	3	433	24	329	12	941	39
	Number of firms	26331	108	12673	504	24946	331	63950	943
	%	95.18	93.10	91.88	91.30	96.92	95.66	95.17	93.00
36 months post (1971-2005)	Mergers	1787	6	1027	46	714	3	3528	55
	Exchanges	94	0	76	3	27	0	197	3
	Liquidations	29	0	32	0	10	1	71	1
	Dropped	288	5	665	39	510	21	1463	65
	Number of firms	24603	105	11664	464	23194	318	59461	887
	%	91.80	90.52	86.63	84.06	94.84	92.71	91.87	87.73
48 month post (1971-2004)	Mergers	2395	8	1374	67	943	6	4712	81
	Exchanges	132	0	104	9	34	0	270	9
	Liquidations	40	0	47	1	12	1	99	2
	Dropped	388	5	862	54	671	24	1921	83
	Number of firms	22980	103	10773	421	21484	309	55237	833
	%	88.61	88.79	81.86	76.27	92.83	90.88	88.75	82.64
60 months post (1971-2003)	Mergers	2909	15	1687	85	1118	7	5714	107
	Exchanges	170	0	128	15	36	0	334	15
	Liquidations	51	0	60	2	13	1	124	3
	Dropped	474	5	1008	67	821	27	2303	99
	Number of firms	21445	96	9977	383	19803	302	51225	781
	%	85.61	82.76	77.58	69.38	90.88	89.61	85.80	77.71

The five panels in this table present information about the number of delistings 12, 24, 36, 48 and 60 months after identification as a non-NCAV firm or NCAV opportunity. Thus, the last panel contains data on firms identified during the 1971-2003 period for which 60-month post identification HPRs can be computed. Of these firms (59,700 non-NCAV, 1,005 NCAV), some firms (8,475 non-NCAV, 224 NCAV) were delisted, leaving us with 51,225 (86%) non-NCAV and 781 (78%) NCAV firms surviving 60months post identification.

non-NCAV and NCAV firms is significant (χ^2=39.65).

Our results of relatively greater delisting activity for NCAV firms than non-NCAV firms differ from those of Xiao and Arnold (2008). They analyze firms listed in London and find that 31.57% of non-NCAV firms and 26.82% of NCAV firms are delisted. However, assuming that the relative percent of delisted firms accounted for by liquidations more directly reflects financial distress risk, our results of relatively lower liquidation levels for NCAV firms is supportive of their conclusion that the superior performance of NCAV firms does not reflect compensation for financial distress risk.

A. PRE and POST identification HPRs

For each NCAV and non-NCAV firm, we obtain monthly returns and calculate holding period returns over 12, 24, 36, 48, and 60 months both prior (PRE) and subsequent (POST) to identification.

Oppenheimer (1986) and Lauterbach and Vu (1993) examine data ending in 1983-1984 whereas we focus on data over the 1971-2007 period. To enable a visual comparison of the different time periods, Table 3 presents HPRs in three panels reflective of the 1971-2007, 1971-1983, and 1984-2007 periods. The results presented in Table 3 are striking. The average PRE HPRs of NCAV firms are significantly lower than those of non-NCAV firms regardless of market listing and time interval analyzed. The underperformance by NCAV firms is generally consistent over all HPRs. The average 12-monthPRE HPRs for all non-NCAV and NCAV firms is 17.3% and 8.4%, respectively, and the difference in PRE returns between non-NCAV and NCAV firms is statistically significant.

The results in Table 3 are also striking for the pronounced shift in POST performance with NCAV firms outperforming non-NCAV firms. The average POST HPRs of NCAV firms are significantly higher than those of non-NCAV firms regardless of market listing and time interval analyzed. The superior performance of NCAV firms is consistent over all HPRs. The average 12-month POST HPR for non-NCAV firms is 15.4% whereas for NCAV firms, it is 32.8%, and the difference in POST returns between non-NCAV and NCAV firms is generally statistically significant. The superior POST performance of NCAV firms appears to hold across exchange listings, time periods, and holding periods.

B. Risk and Alpha

The results above suggest that the strong POST recovery for NCAV firms reflects a correction for the dramatic PRE price reduction consistent with the evidence of overreaction provided by DeBondt and Thaler (1985, 1987). This more intense PRE price reduction and POST price recovery for NCAV firms must therefore correspond with higher levels of variance in the calculation of either PRE of POST HPRs. Thus, higher measures of risk for NCAV firms reflected through variance are completely consistent with overreaction.

In order to determine if the more dramatic price pattern of NCAV firms results in higher measures of risk for NCAV firms, we calculate the variance of monthly returns in the PRE and POST period. We analyze these results by exchange listing (NYSE, AMEX, and NASDAQ) and various lengths (12, 24, 36, 48, and 60 months) of pre- and post-identification returns. We also estimate the coefficients (alpha and beta) of the market model in the PRE and POST periods using this model:

$$R_{it} - R_{ft} = \propto_i + \beta_i (R_{mt} - R_{ft}) + \varepsilon_{it}$$

where

R_{it} = the month t return of security i (obtained from CRSP)
R_{ft} = the "risk-free"one-month T-Bill ratein month t (obtained from the Federal Reserve)
R_{mt} = the "market" return in month t (the value-weighted CRSP return)
ε_{it} = the zero mean serially uncorrelated error term for security i in month t

$$\beta_i = \frac{Co\,\text{var}\,iance(R_{it}, R_{mt})}{Variance(R_{mt})}$$

α_i = a measure of the monthly abnormal performance for security i.

Finally, we conduct tests of differences in alpha, beta, and variance between non-NCAV and NCAV firms. We present these results in Table 4.

Some clear patterns emerge from this analysis. First, variance is greater for NCAV firms than non-NCAV firms, and greater variance of NCAV firms is evident both in the PRE and POST period and is independent of listing exchange. Second, NYSE and AMEX traded NCAV firms have higher PRE betas. On the other hand, NASDAQ traded non-NCAV firms have higher PRE betas. Third, the POST betas of NCAV firms are greater than those of non-NCAV firms only for NYSE traded firms. POST betas of non-NCAV and NCAV firms are not significantly different from each other for both AMEX and NASDAQ traded firms. This is an equally-weighted average of individual betas and not a value-weighted average; and as such, the average beta is expected to be greater than 1. Fourth, estimates of abnormal returns captured through alpha show that non-NCAV firms generally have significantly greater PRE alphas while NCAV firms have significantly higher POST alphas. These results suggest that NCAV firms are relatively inferior PRE performers and superior POST performers.

Our evidence of significantly lower PRE HPR and alpha levels and significantly higher POST HPR and alpha levels for NCAV firms reveals a pattern remarkably similar to that of DeBondt and Thaler's (1985) loser portfolios. In their analysis of price performance of winning and losing portfolios, DeBondt and Thaler show that overreaction is asymmetric in that the correction for losing portfolios is greater than the correction for winning portfolios.

C. Size and BM

In one of the first studies looking at the effect of firm size, Banz (1981) shows that for over 40 years, small firms generate higher risk-adjusted returns than large firms. This relationship is non-linear in that medium-sized firms do not generate higher risk-adjusted returns than large firms. The BM ratio is another variable found to be significantly related to returns by Rosenberg, Reid, and Lanstein (1985) who reveal that higher returns are associated with portfolios of high BM stocks. And more recently, Fama and French (2006) in their analysis of returns from 1928 to 2004 conclude that it is size and BM, or risks related to them, and not beta, that are rewarded in

average returns. We therefore compare size and the BM ratio for non-NCAV and NCAV firms in our sample. These results of are presented in Table 5.

As expected, the NCAV firms are significantly smaller and have higher BM ratios as compared to the non-NCAV firms. This observation suggests that size and the BM ratio should be included in explaining the superior performance (Table 3) of NCAV firms.

D. Multivariate Results

Our initial analysis reveals that firms which meet the NCAV stock selection criterion exhibit significantly higher post identification HPRs as compared to firms which do not meet the NCAV criterion. The post-identification HPR, however, is a raw return; and a more interesting question would be whether the superior POST performance of NCAV firms would persist after controlling for other variables which may influence returns.

Our observations on the POST performance of NCAV firms—NCAV firms are smaller, have greater HPR variance, and greater BM values as compared to non-NCAV firms—is consistent with Banz (1981), Rosenberg, Reid, and Lanstein (1985), and Fama and French (1992). Our results are also consistent with Reinganum (1981) and Lakonishok and Shapiro (1986) in that we find no significant difference between the betas of non-NCAV and NCAV AMEX and NASDAQ firms. Although the betas of NYSE NCAV firms are greater than those of NYSE non-NCAV firms, the relatively small presence of NYSE firms among NCAV firms minimizes this inconsistency. Our finding that superior post-identification HPRs follows underperformance prior to identification as an NCAV opportunity is also consistent with the DeBondt and Thaler (1985) overreaction hypothesis. These findings suggest that pre-identification returns, beta, variance of returns, size, and the BM ratio are relevant control variables in evaluating the superior post-identification performance of NCAV firms.

We next conduct a multivariate regression analysis to simultaneously include variables which may explain the superior performance of NCAV firms. The dependent variable in this regression analysis is the post identification HPR for each firm in our sample. The explanatory variables include *PRE HPR* (the pre identification HPR of each firm in our sample), *dNCAV* (a dummy variable which identifies firms which meet the NCAV criterion (the primary variable of interest), β (a measure of the firms systematic risk), σ^2 (the variance in HPRs), *Log Size* (the log of the market value of equity), and *BM* (the book-to-market ratio). As before, this analysis is conducted using all non-NCAV and NCAV firms in our sample separately for HPRs of 12, 24, 36, 48, and 60 month duration. The results of the multivariate regression analysis are presented in Table 6.

The results presented in Table 6 provide many insights which explain post-identification holding period returns. First, size is negatively related to POST HPR performance. Second, BM is positively related to POST HPR performance. Third, β is generally positively related to POST HPR performance. Interestingly, the sign on beta is negative during 1971-1983 whereas it is positive during 1984-2007 for 12-month HPRs. While regression results by market listing are neither central to our investigation nor presented in Table 6, this change in sign for beta reflects a corresponding change in sign for NYSE firms as well as the presence of NASDAQ firms after 1984. Prior to 1984, beta is negatively related to both 12 and 24-month POST HPRs for NYSE firms. After 1984, beta is positively related to 24, 36, 48, and 60-month POST HPRs for NYSE firms. For NASDAQ firms from 1984-2007, beta is positively related to all POST HPR measures.

Table 3.Pre- and Post-Identification Holding Period Returns

		NYSE Firms		AMEX Firms		NASDAQ Firms		TOTAL Firms	
Time Period		Non-NCAV	NCAV	Non-NCAV	NCAV	Non-NCAV	NCAV	Non-NCAV	NCAV
1971-2007	12m Pre	0.170	0.195	0.183	0.148	0.171**	-0.055	0.173*	0.084
	24m Pre	0.345**	0.027	0.366**	0.035	0.378**	-0.349	0.362**	-0.098
	36m Pre	0.542**	-0.205	0.574**	-0.096	0.582**	-0.436	0.564**	-0.221
	48m Pre	0.782**	-0.188	0.809**	-0.120	0.823**	-0.452	0.803**	-0.234
	60m Pre	1.047**	-0.088	1.069	-0.082	1.069**	-0.497	1.060**	-0.211
	12m Post	0.153	0.301**	0.171	0.338**	0.145	0.321**	0.154	0.328**
	24m Post	0.335	0.608**	0.373	0.660**	0.315	0.540**	0.335	0.613**
	36m Post	0.554	0.939**	0.623	1.022**	0.465	0.721**	0.535	0.910**
	48m Post	0.778	1.369**	0.862	1.350**	0.593	0.923**	0.727	1.208**
	60m Post	1.007	1.650**	1.100	1.790**	0.739	1.138*	0.929	1.555**
1971-1983	12m Pre	0.219	0.237	0.248	0.193	0.415	-0.022	0.232*	0.199
	24m Pre	0.358**	0.086	0.417**	0.098	0.523*	-0.347	0.382**	0.093
	36m Pre	0.547**	-0.178	0.672**	-0.041	1.114**	-0.265	0.599**	-0.065
	48m Pre	0.745**	-0.155	0.894**	-0.062	1.663*	-0.156	0.808**	-0.078
	60m Pre	0.988**	-0.046	1.166**	-0.009	2.546**	-0.240	1.066**	-0.017
	12m Post	0.178	0.308**	0.230	0.324**	0.119	0.279	0.197	0.321**
	24m Post	0.368	0.662**	0.469	0.647**	0.314	0.386	0.405	0.648**
	36m Post	0.645	0.979**	0.809	1.069**	0.603	0.664	0.706	1.051**
	48m Post	0.960	1.340**	1.161	1.454**	0.874	0.868	1.034	1.431**
	60m Post	1.293	1.733**	1.525	1.963**	1.133	0.981	1.378	1.917
1984-2007	12m Pre	0.142*	-0.003	0.131**	-0.088	0.169**	-0.055	0.154**	-0.059
	24m Pre	0.338**	-0.258	0.325**	-0.304	0.377**	-0.349	0.356**	-0.336
	36m Pre	0.540**	-0.333	0.495**	-0.393	0.579**	-0.438	0.552**	-0.424
	48m Pre	0.805**	-0.339	0.741**	-0.436	0.817**	-0.456	0.801**	-0.446
	60m Pre	1.082**	-0.287	0.992**	-0.461	1.059**	-0.501	1.058**	-0.482
	12m Post	0.139	0.271	0.124	0.414**	0.145	0.322**	0.140	0.337**
	24m Post	0.315	0.350	0.294	0.729**	0.315	0.541**	0.311	0.569*
	36m Post	0.498	0.751*	0.462	0.768*	0.464	0.721**	0.476	0.732*
	48m Post	0.660	1.509*	0.593	0.796*	0.591	0.924**	0.615	0.925*
	60m Post	0.810	1.251	0.702	0.868	0.735	1.140*	0.756	1.091

The "Pre" period reflects HPR calculations ending in June of year t; "Post" period reflects HPR calculations beginning in July of year t. Since our returns data ends in 2008, the last eligible year for firms used in calculating 12, 24, 36, 48, and 60 month HPRs is 2007, 2006, 2005, 2004 and 2003 respectively. Symbols ** and * indicate significant differences between the non-NCAV and NCAV firms' HPRs at the 1% and 10% levels, respectively.

Table 4.Market Model Coefficients and Variance for Pre- and Post-IdentificationPeriods

		NYSE Firms		AMEX Firms		NASDAQ Firms		TOTAL Firms	
		Non-NCAV	NCAV	Non-NCAV	NCAV	Non-NCAV	NCAV	Non-NCAV	NCAV
Variance	12m Pre	0.013	0.034**	0.029	0.041**	0.042	0.084**	0.028	0.055**
	24m Pre	0.014	0.027**	0.030	0.035**	0.043	0.071**	0.028	0.047**
	36m Pre	0.013	0.021**	0.028	0.030**	0.039	0.066**	0.026	0.042**
	48m Pre	0.012	0.019**	0.025	0.027**	0.035	0.056**	0.024	0.036**
	60m Pre	0.012	0.017**	0.023	0.024**	0.031	0.045**	0.021	0.031**
	12m Post	0.014	0.026**	0.033	0.037**	0.044	0.077**	0.030	0.049**
	24m Post	0.015	0.024**	0.033	0.035**	0.046	0.082**	0.031	0.049**
	36m Post	0.015	0.022**	0.032	0.035**	0.047	0.078**	0.031	0.047**
	48m Post	0.015	0.021**	0.031	0.034**	0.047	0.078**	0.031	0.046**
	60m Post	0.016	0.021**	0.032	0.036**	0.049	0.082**	0.032	0.047**
Beta	12m Pre	1.128	1.488**	1.135	1.191	1.272*	1.168	1.185	1.217
	24m Pre	1.129	1.399**	1.190	1.207	1.299**	1.207	1.207	1.229
	36m Pre	1.120	1.392**	1.197	1.273**	1.282**	1.185	1.197	1.257**
	48m Pre	1.109	1.363**	1.183	1.298**	1.239**	1.081	1.171	1.236**
	60m Pre	1.100	1.336**	1.171	1.302**	1.205**	1.050	1.152	1.228**
	12m Post	1.106	1.394**	1.114	1.092	1.232*	1.157	1.157	1.149
	24m Post	1.100	1.344**	1.129	1.063	1.240	1.321	1.158	1.183
	36m Post	1.085	1.308**	1.119	1.069	1.225	1.341	1.145	1.189
	48m Post	1.068	1.348**	1.095	1.081	1.196	1.351	1.121	1.203
	60m Post	1.052	1.337**	1.074	1.049	1.156	1.341	1.095	1.180
Alpha	12m Pre	0.003	0.012*	0.006	0.009**	0.005	0.006	0.004	0.008**
	24m Pre	0.003	0.003	0.005*	0.003	0.005**	-0.005	0.004**	0.000
	36m Pre	0.003**	-0.003	0.005**	0.000	0.007**	-0.006	0.005**	-0.003
	48m Pre	0.004**	-0.004	0.006**	-0.001	0.008**	-0.005	0.006**	-0.003
	60m Pre	0.004**	-0.004	0.006**	-0.002	0.008**	-0.006	0.006**	-0.003
	12m Post	0.003	0.016**	0.007	0.021**	0.004	0.021**	0.004	0.020**
	24m Post	0.004	0.013**	0.006	0.018**	0.004	0.018**	0.004	0.017**
	36m Post	0.004	0.012**	0.006	0.018**	0.004	0.015**	0.005	0.016**
	48m Post	0.004	0.010**	0.006	0.017**	0.004	0.014**	0.005	0.015**
	60m Post	0.004	0.007**	0.006	0.016**	0.005	0.013**	0.005	0.014**

The calculation of alpha, beta, and variance used monthly returns from 12, 24, 36, 48, and 60 months, both pre- and post-identification of NCAV firms. Symbols **and * indicate significant differences between the non-NCAV and NCAV firms' coefficients at the 1% and 10% levels, respectively.

Fourth, the relationship between σ^2 and POST HPR performance depends primarily on the length of time that POST HPRs are measured. In particular, σ^2 is positively related to 12 and 24-

Table 5. The Size and Book-to-Market Ratio (BM) of Non-NCAV and NCAV Firms

	NYSE Firms		AMEX Firms		NASDAQ Firms		TOTAL Firms	
	Non-NCAV	NCAV	Non-NCAV	NCAV	Non-NCAV	NCAV	Non-NCAV	NCAV
Firms identified in the period 1971-2007								
Size	3034.4**	25.63	116.2*	7.20	426.5**	22.86	1431.7**	14.67
BM	0.911	4.179**	1.095	3.949**	0.766	3.242**	0.892	3.734**
Firms identified in the period 1971-1983								
Size	693.2**	23.39	39.6*	5.93	208.5**	8.47	443.7**	8.91
BM	1.454	4.318**	1.555	3.822**	1.078	5.404**	1.488	3.917**
Firms identified in the period 1984-2007								
Size	4346.7**	36.40	176.4*	14.07	428.1**	23.03	1741.8**	21.91
BM	0.607	3.516**	0.733	4.626**	0.764	3.217**	0.705	3.503**

Size is the market value of the firm's common stock and is presented in $ millions. Symbols **and * indicate significant differences between the non-NCAV and NCAV firms at the 1% and 10% levels respectively.

month POST HPRs but negatively related to 36, 48, and 60-month HPRs. This result is consistent with Bildersee, Cheh, & Zutshi (1993) who find that the choice of holding period used in the analysis is important. Fifth, in support of DeBondt and Thaler's (1985, 1987) contention that equity returns performance through time reflects overreaction and correction, PRE HPRs are negatively related to POST HPRs.

Finally, the coefficient on the dNCAV variable is positive, which shows that even after simultaneously controlling for differences in size, BM, β, volatility, and prior price performance, the superior post-identification performance of NCAV firms persists; also, analysis of correlations among independent variables reveals no evidence of multicollinearity.

V. Conclusions

Benjamin Graham's NCAV criterion to identify value firms with promising prospects continues to work, particularly during times of economic contractions. Even after accounting for size, BM, β, volatility, and prior performance, NCAV firms continue to outperform non-NCAV firms on a risk-adjusted basis. Consistent with overreaction, NCAV firms experience lower PRE HPR and alpha levels, higher POST HPR and alpha levels, and greater measures of HPR variance both PRE and POST. However, overreaction provides only a partial explanation for the superior POST HPR performance of NCAV firms.

Although NCAV firms are smaller compared to non-NCAV firms and have greater BM values, NCAV firms are not financially distressed. By definition, however, NCAV firms have current assets greater than total liabilities. Consequently, bankruptcy is less of a concern to these

Table 6. Regression Analysis Explaining the Post-Identification Return of NCAV Firms

	1971-2007		1971-1983		1984-2007	
	Estimate	t-statistic	Estimate	t-statistic	Estimate	t-statistic
12 month HPRs						
Intercept	0.117	16.46**	0.171	12.55**	0.084	9.49**
PRE HPR	-0.032	-8.51**	-0.096	-13.28**	-0.017	-3.77**
dNCAV	0.131	5.87**	0.043	1.75*	0.169	4.84**
B	0.022	13.11**	-0.049	-11.61**	0.028	14.99**
σ^2	0.375	19.50**	3.411	18.81**	0.355	17.35**
LogSize	-0.010	-7.62**	-0.010	-4.01**	-0.006	-3.67**
BM	0.001	1.61	0.008	3.80**	0.000	0.32
24 month HPRs						
Intercept	0.266	21.57**	0.366	17.28**	0.223	14.33**
PRE HPR	-0.040	-11.06**	-0.006	-0.84	-0.045	-10.57**
dNCAV	0.192	5.17**	0.104	2.95**	0.204	3.41**
B	0.052	13.88**	-0.006	-0.73	0.057	13.15**
σ^2	0.113	3.33**	1.807	5.95**	0.106	2.86**
LogSize	-0.019	-8.67**	-0.042	-11.77**	-0.011	-3.99**
BM	0.004	3.56**	0.017	6.04**	0.003	2.27*
36 month HPRs						
Intercept	0.477	28.33**	0.760	22.27**	0.370	17.78**
PRE HPR	-0.040	-10.75**	-0.023	-3.13**	-0.045	-10.44**
dNCAV	0.200	4.05**	0.085	1.53	0.162	2.07*
B	0.079	13.49**	0.076	5.40**	0.077	11.57**
σ^2	-0.286	-6.22**	-2.008	-3.93**	-0.239	-4.87**
LogSize	-0.035	-11.74**	-0.092	-16.31**	-0.016	-4.30**
BM	0.006	4.35**	0.020	4.31**	0.004	2.82**
48 month HPRs						
Intercept	0.663	30.26**	1.149	24.40**	0.475	17.84**
PRE HPR	-0.044	-11.24**	-0.044	-5.98**	-0.049	-10.40**
dNCAV	0.216	3.41**	0.044	0.57	0.164	1.64
B	0.109	13.21**	0.214	10.47**	0.089	9.69**
σ^2	-0.507	-8.68**	-7.563	-10.53**	-0.379	-6.21**
LogSize	-0.046	-11.75**	-0.138	-17.96**	-0.013	-2.66**
BM	0.009	5.27**	0.016	2.61**	0.007	3.70**
60 month HPRs						
Intercept	0.809	28.36**	1.531	23.83**	0.525	15.46**
PRE HPR	-0.051	-12.93**	-0.047	-6.70**	-0.056	-11.99**
dNCAV	0.285	3.52**	0.057	0.54	0.201	1.59
B	0.154	13.45**	0.341	11.93**	0.113	8.96**
σ^2	-0.718	-9.79**	-12.690	-12.93**	-0.510	-6.83**
LogSize	-0.048	-9.49**	-0.181	-17.46**	0.002	0.37
BM	0.010	4.69**	0.015	1.80	0.007	3.18**

Symbols ** and * indicate that the estimated coefficient is significantly different from zero at the 1% and 10% levels respectively. The dependent variable is the post-identification HPRs, and the primary variable of interest is the dummy variable (dNCAV) which identifies firms which meet the NCAV criterion.

firms since firms under financial distress should be associated with higher levels of debt and lower levels of liquid assets. It can also be confirmed in Table 2 that NCAV firms are less likely to be delisted because of liquidation. Again, size and BM provide only a partial explanation for the superior HPR performance of NCAV firms.

That NCAV firms have sufficient net current assets to cover all obligations and yet appear clustered during economic downturns is suggestive of increased mispricing opportunities during these periods. This clustering suggests that markets do not sufficiently distinguish between strong and weak firms during contractions and that relatively recent price declines lead to the availability of NCAV opportunities.

The evidence presented here suggests that the NCAV selection criterion can be used to select securities to create a portfolio that could generate superior risk-adjusted returns. The persistence of the NCAV criterion is surprising given the simple security selection methodology, the use of publicly available information, and the length of time for which the anomaly has persisted. The continued existence of such excess returns after adjusting for factors like size, risk, and prior performance is, of course, at odds with the efficient markets hypothesis.

References

Banz, R. (1981).The relationship between return and market value of common stocks. *Journal of Financial Economics*, *9*, 3-18.

Beaver, W., McNichols, M., & Price, R. (2007).Delisting returns and their effect on accounting-based market anomalies. *Journal of Accounting & Economics*, *43*, 341-368.

Bildersee, J., Cheh, J., & Zutshi, A. (1993). The performance of Japanese common stocks in relation to their net current asset values. *Japan and the World Economy*, *5*, 197-215.

Chan, K., & Chen, N. (1988). An unconditional asset-pricing test and the role of firm size as an instrumental variable for risk. *Journal of Finance*, *43*, 309-425.

Davis, J. (1994). The cross-section of realized stock returns: The pre-COMPUSTAT evidence. *Journal of Finance*, *49*, 1579-1593.

DeBondt, W., & Thaler, R. (1985). Does the stock market overreact? *Journal of Finance*, *40*, 793-805.

DeBondt, W., & Thaler, R. (1987).Further evidence on investor overreaction and stock market seasonality. *Journal of Finance*, *42*, 793-805.

Dimson, E., & Marsh P. (1986). Event study methodologies and the size effect: The case of U.K. press recommendations. *Journal of Financial Economics*, *17*, 113-142.

Fama, E., & French, K. (1992). The cross-section of expected stock returns. *Journal of Finance*, *47*, 427-467.

Fama, E., & French, K. (1993).Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, *33*, 3-56.

Fama, E., & French, K. (1995). Size and book-to-market factors in earnings and returns. *Journal of Finance*, *50*, 131-155.

Fama, E., & French, K. (1996). Multifactor explanations of asset pricing anomalies. *Journal of Finance*, *51*, 55-84.

Fama, E., & French, K. (1998). Value versus growth: The international evidence. *Journal of Finance*, *53*, 1975-1999.

Fama, E., & French, K. (2006).The value premium and the CAPM. *Journal of Finance*, *61*, 2163-2185.

Graham, B. (1949). *The Intelligent Investor.* New York: Harper & Row.

Graham, B. (1973). *The Intelligent Investor*. New York: Harper & Row.

Grinold, R. (1993). Is beta dead again? *Financial Analysts Journal*, *49*, 28-34.

He, J., & Ng, L. (1994). Economic forces, fundamental variables and equity returns. *Journal of Business*, *67*, 599-639.

Huberman, G., & Kandel, S. (1985). Size-related covariation of stock returns. University of Chicago Working Paper.

Keim, D. (1983). Size related anomalies and stock return seasonality: Further empirical evidence. *Journal of Financial Economics*, *12*, 3-32.

Lakonishok, J., & Shapiro, A. (1986). Systematic risk, total risk and size as determinants of stock market returns. *Journal of Banking and Finance*, *10*, 115-132.

Lauterbach, B., & Vu, J. (1993). Ben graham's net current asset value rule revisited: The size-adjusted returns. *Quarterly Journal of Business and Economics*, *32*, 82-108.

Oppenheimer, H. (1986). Ben graham's net current asset values: A performance update. *Financial Analysts Journal*, *42*, 40-47.

Reinganum, M. (1981).A new empirical perspective on the CAPM. *Journal of Financial and Quantitative Analysis*, *16*, 439-462.

Reinganum, M. (1983). Portfolio strategies based on market capitalization. *Journal of Portfolio Management*, *9*, 29-36.

Rosenberg, B., Reid, K., & Lanstein, R. (1985).Persuasive evidence of market inefficiency. *Journal of Portfolio Management*, *11*, 9-17.

Shumway, T., & Warther, V. (1999). The delisting bias in CRSP's nasdaqdata and its implications for the size effect. *Journal of Finance*, *54*, 2361-2379.

Vu, J. (1988).An empirical analysis of Ben Graham's net current asset value rule. *Financial Review*, *23*, 215-225.

Xiao, Y., & Arnold, G. (2008).Testing Benjamin Graham's net current asset value strategy in London. *The Journal of Investing*, *17*, 11-19.